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Can Viewing Films Promote Creative Thinking Styles? Examining The Complex Roles of Personality and Meaning-Making

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ABSTRACT

Can watching avant-garde film temporarily shift individuals' thinking styles? What factors influence how individuals respond to avant-garde films? The perception of meaning is a critical element in the positive reception of visual artworks and may be an important mediating step in influencing creative thought. This highlights a unique problem for art forms in which meaning is more open to interpretation, such as avant-garde art. Past research indicates a relationship between preference for nonrepresentational art forms and schizotypy; this may be driven by differences in the ability to perceive meaning. In two studies, we investigate the ability of two film types to promote two correlates of creativity, overinclusive thinking – characterized by conceptual expansion – and creative inspiration, as a function of meaning-making and schizotypy. We find that lower levels of schizotypy predict greater perceived meaning from a conventional film, which in turn mediates an effect on overinclusive thinking and creative inspiration. We further find that once schizotypy and meaning-making are held constant, viewing an avant-garde film leads to greater overinclusive thinking. The results suggest that it may be necessary for individuals lower in schizotypy to experience a film as meaningful in order to be afforded further cognitive opportunities related to creative thinking.

The avant-garde challenges convention. The original use of the word, around the time of the French Revolution, referred to the political role that artists would play in reimagining society (Cottington, 2013). As the term took hold in the cultural arena, it continued to be used for art that radically defies existing forms and values. In short, *avant-garde* refers to artistic works designed to promote changes in their audience's mind-sets – to challenge existing belief frameworks. But what is the actual impact on cognition? And why do avant-garde works seem to speak to some people, but leave others befuddled? The present research examined factors that affect viewers' responses to avant-garde and conventional film types. In particular, we examine the role that meaning-making and the schizotypal personality trait play in driving downstream effects on cognition following film viewing.

Audience reception and artistic intention

Psychological research has overwhelmingly demonstrated that the aesthetic response is relational – it transpires between the viewer and the artwork. Individual differences, including personality, demographics, and

expertise (Coggiola, 2004; Furnham & Walker, 2001; Silvia, 2006; Silvia & Nusbaum, 2011) as well as cognitive factors, like processing fluency (Reber, Schwarz, & Winkielman, 2004; Reber, Winkielman, & Schwarz, 1998; Winkielman, Halberstadt, Fazendeiro, & Catty, 2006) have been shown to influence the reception of art. To date, the majority of research has focused on viewer responses to static, 2-dimensional works, such as paintings, photographs, and postcards (Furnham & Avison, 1997; Gocłowska, Baas, Elliot, & De Dreu, 2017; Rawlings, 2000), but little attention has been given to responses to artistic film (Swami et al., 2010).

One critical factor determining the reception of an artistic work is the capability of the observer to make meaning of it. Meaning-making is the ability to use images and ideas to explore and reconstruct one's own understanding and experiences (Gude, 2008). It has been suggested that aesthetic experience peaks when the observer successfully constructs a sense of meaning (Tinio, 2013). Conversely, a sense of meaninglessness has been suggested to underpin negative reactions to nonrepresentational art (Landau, Greenberg, Solomon, Pyszczynski, & Martens, 2006). Meaning-making may then be a critical factor in determining whether an

artistic work is efficacious in producing cognitive effects in its audience. This becomes especially relevant when considering aesthetic responses to styles of art which seek to challenge held beliefs or meaning frameworks. In the broader class of nonrepresentational art, such as abstract art, modern art, or the avant-garde, the goal is not to faithfully represent reality but rather juxtapose, subvert, or reimagine it. These and many other art forms violate expectations and challenge the audience to accommodate a new understanding.

Over the past 40 years, social psychologists have shown that threats to meaning can cause individuals to confirm their existing beliefs to mitigate a heightened state of arousal, a process labeled meaning maintenance (e.g., Heine, Proulx, & Vohs, 2006; Jost, Banaji, & Nosek, 2004; Kay, Gaucher, Napier, Callan, & Laurin, 2008; Steele, 1988). This research has recently been extended to understanding the reception of nonrepresentational artistic products. For instance, after exposure to absurdist literature and art, individuals experienced a heightened need for structure and engaged in compensatory efforts of meaning affirmation (Proulx, Heine, & Vohs, 2010). Disrupting an audience's ability to make meaning may therefore cause individuals to double down on their preexisting conceptions rather than becoming open to new ideas. Since the aim of avant-garde art is to broaden an individual's perspective and promote new ways of thinking, this audience reaction would be at odds with the artistic intention. Importantly, however, this response may not arise in everyone; the role of personality is an important consideration when examining meaning threats in the context of aesthetic responses.

The significance of the schizotypal personality trait

Over the past 20 years, multiple studies have demonstrated that individual differences in schizotypy play an important role in the positive reception of nonrepresentational, or abstract, art forms (Rawlings, 2000; Twomey, Burns, & Morris, 1998). Schizotypy has been associated with loose conceptual boundaries and a heightened ability to construct meaning from ambiguous stimuli (Partos, Cropper, Rawlings, & Herzog, 2016). These factors may be critical to understanding the relationship between schizotypy and preferences for less representational, or more interpretative, styles of art. As discussed, negative reactions to modern art are often driven by a failure to extract meaning; therefore, we might expect that individuals who are especially predisposed to meaning-making, as in the case of highly schizotypal individuals (Martindale, Moore, & Borkum, 1990; Rawlings, Twomey, Burns, & Morris, 1998), would be better

insulated from these adverse reactions. Schizotypal individuals' increased tendency to perceive meaning from ambiguous stimuli may facilitate more positive reactions to the ambiguity inherent in nonrepresentational artworks.

Successful meaning-making in response to art may also facilitate further cognitive effects. However, very limited research has examined whether personality-dependent aesthetic responses lead to downstream effects, such as imaginative or creative thinking (Gocłowska, Baas, Crisp, & De Dreu, 2014). It is plausible that secondary effects on cognition would depend on successful meaning-making. If this is the case, then for individuals high in schizotypy the tendency to construct meaning from nonrepresentational art may aid in facilitating further downstream effects on cognition.

Avant-garde film

Although past research has indicated that individual differences in schizotypy may play a role in the reception of nonrepresentational static art, there exists limited work investigating similar effects in film. We were therefore interested in examining schizotypy and meaning-making in the context of avant-garde film. For this, we focused on the avant-garde movement Lettrism (1947-present). Lettrist film, like abstract art, employs artistic visuals that are divorced from their representative capacities and therefore unbounded by the strict conceptual categories of representational art. It has been suggested that artistic works undermine meaning when "they do not appear to possess any recognizable form or content and thereby stretch the latitude of culturally derived or personally relevant concepts to the point that the observer has no vocabulary or perceptual resources to meaningfully interpret it" (pg. 881, Landau et al., 2006). This mirrors the experiential quality of Lettrist films. Lettrists film-makers employed the principle of *montage discrépant*, or discrepant editing, which dictated that unity of color and sound should be broken and treated asynchronously from the image (Isou, 1952). The Lettrists scratched the celluloid filmstrip, painted it, carved out the eyes of characters, and merged film stock and soundtrack in incongruent ways (for reference, see Figure 1). Unlike conventional film, Lettrist film had few pre-defined conceptualizations.

Overinclusive thinking

By disrupting the conventions of film, the founder of Lettrism, Isidore Isou, intended to expand conceptual boundaries and promote new ways of thinking (Isou, 1946, 1947; Lemaître, 1966; Isou, 1983). Creative and
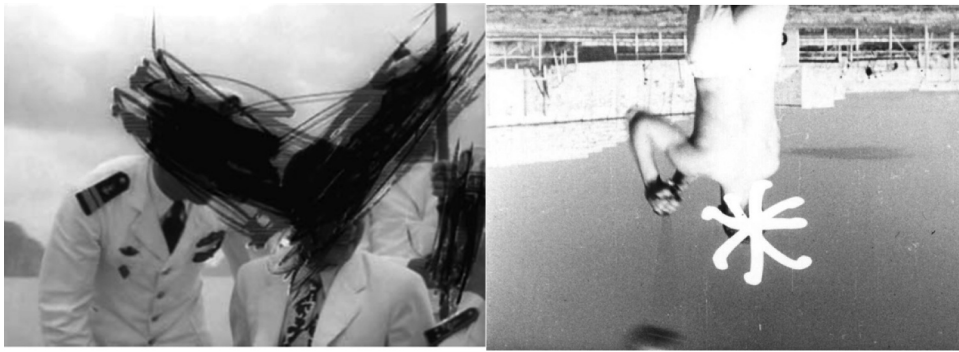
Figure 1. Isidore Isou, Treatise on Venom and Eternity (1951/2008). The stills show examples of chiseled filmstrips. The soundtrack is completely unrelated to the manipulated archival footage.

schizotypal thinking is similarly characterized by broad conceptual thinking, also known as *overinclusive thinking*. Overinclusive thinking refers to a tendency to not observe normative conceptual boundaries (Andreasen and Powers, 1974; DeYoung, 2013), which in turn leads to the association of distantly related or unrelated ideas. This style of thinking is often measured in psychological research by asking participants to rate how much exemplars belong to a given category. Individuals displaying overinclusive thinking tend to rate atypical exemplars as more highly belonging to a distantly related category (e.g., a *camel* belonging to the category *vehicle*).

This overgeneralizing style of thinking is thought to underscore the long-observed association between creativity and schizotypy (Abraham, Windmann, Daum, & Güntürkün, 2005; Guastello, Guastello, & Hanson, 2004). Indeed, this relationship has been explicitly supported by a recent study showing that overinclusive thinking partially mediates the relationship between schizotypy and creativity (Wang et al., 2018). Interventions that promote conceptual expansion have also been found to promote overinclusive thinking and creative thinking (Chiu, 2015), presumably by enhancing the association of concepts that are not typically combined. We reasoned that exposure to ideas and imagery presented in new and unusual ways, as exemplified in Lettrist film, may also facilitate overinclusive thinking. As previously suggested, however, we anticipated that the cognitive effects afforded by film viewing might depend on successful meaning-making.

Study 1

In sum, the first study was designed to extend past research on aesthetic response by 1) examining the effects of watching an avant-garde film (vs. a conventional film) on meaning-making and overinclusive thinking and 2) determining the role of the schizotypal personality trait in driving these effects. We predicted there would be a main effect of film on meaning-making, such that greater meaning would be perceived in the conventional compared to the avant-garde film (given that the chosen avant-garde film is intentionally hard to comprehend). However, we further predicted an interaction between schizotypy and film type. For individuals at lower levels of schizotypy, we predicted greater meaning-making in the conventional film compared to the avant-garde film. For individuals at higher levels of schizotypy, we anticipated that the avant-garde film would be perceived as equally or more meaningful than the conventional film. We further explored how these personality-dependent effects may support downstream effects on overinclusive thinking.

Method

Participants

Approval for this study was obtained by the Human Subjects Institutional Review Board at the University of California, Santa Barbara. 163 participants (76 females, 84 males, 3 individuals chose not to respond) with a mean age of 35.3 years ($SD = 9.8$) were recruited online through Cloud Research (cloudresearch.com), powered by Turkprime, in exchange for payment. Participants were limited to those located in the US.

Given growing data quality issues with Mturk populations, we utilized several settings offered through TurkPrime to screen participants at the outset. This included blocking duplicate geolocations and IP addresses, as well as excluding participants who have previously been flagged (i.e., the "Universal Exclude List"). We also limited respondents to participants with over 90% approval rate (i.e., participants who successfully complete studies and provide correct completion codes) and with between 100 and 1000 studies approved.

Within the survey, we used a captcha to screen bots and asked participants to choose the Australian Time Zone from a long list of possible time zones (i.e., a screening question). Participants were required to pass these checks in order to proceed to the consent form and begin the study.

Materials

Film: In the experimental condition ($N = 73$), subjects watched a 5-minute clip from the Lettrist film *Traité de bave et d'éternité*, or *Treatise on Venom and Eternity*, released by Isidore Isou in 1951. This was the first Lettrist film ever recorded and the only one by Isou. Its role in the movement is essential because it sets out the avant-garde principles that future Lettrist films would follow. Subjects in the control condition ($N = 90$) watched a 5-minute clip from *La Ronde*, a conventional French Academy Award-nominated film directed by Max Ophüls in 1950. This film was chosen because Isou directly criticizes the realist and conventional films of his time in *Treatise*. *La Ronde* was the most popular film in France in the year Isou produced his. Both films are black-and-white, recorded in French and shown with English subtitles. We chose 5 minutes segments to increase the chance that the participants would watch the clip in full. In addition, participants were warned that questions about the video would follow and they were unable to move forward in the study until the video had completed.

In the experimental condition, the clip included the following original introduction, which is coupled with a soundtrack of Lettrist "chanting," nonsense phonemic poetry, grunts and howls:

"Notice: It is said the public is stupid. That is why those who hold it in contempt never dare offer it something original. The public is reduced to the smallest common denominator. In the following chapter, the author will attempt to apply the ideas from the first part of his picture. You can see ordinary motion pictures any day in the week in any neighborhood movie. I hope you will quietly watch the screening of this film which at least has the virtue of being different. This "treatise" is a willful accumulation of errors, a species of anti-grammar (in the sense that there *is* a grammar of the Cinema). In an era where everyone is concerned with beautiful photography, the point here is to destroy the image. By destroying the object of painting, Picasso gave a new purpose to painting. That is why the painters of colored picture post-cards are failures. On the other hand, we have been able, for the first time in the annals of the Cinema, to complete a scenario independent in itself, without being forced to intercut it with "visual elements." Therefore, an attentive spectator will be able to *hear* the most beautiful scenario in the history of the Cinema. Dear Spectators: Your hissing and your booing make no impression upon me, because from Victor Hugo's "Hernani" to Buñuel's "The Age of Gold," Cannes Grand Prize winner, everything I have ever loved has always been hissed and booed at first. At the premiere of "The Age of Gold," the angry audience broke the theater seats. What worse can happen to me and how can that affect me? The seats do not belong to me." – The Author.

Meaning: Participants rated the degree to which they found the film meaningful, using a scale of 0–5: *not at all meaningful* to *extremely meaningful*. This measurement follows similar methods from recent studies in which elements of the aesthetic response, feelings of meaning, and/or feelings of comprehension were measured with a single item (Keller, Sommer, Klöckner, & Hanss, 2019; Leder, Gerger, Dressler, & Schabmann, 2012; Mullennix, Pilot, Steeves, & Burns, 2018).

Overinclusive thinking: To measure *overinclusive thinking*, a revised version of a categorization task (Isen & Daubman, 1984; revised by Chiu, 2015) was employed. In this task, participants are asked to rate items on how much they belong to the category *clothing*. The items include typical and atypical exemplars; typical exemplars are *pants, shirt, suit*, and atypical exemplars are *cane, ring, purse*. Using a 10-point Likert scale, with anchors "definitely does NOT belong" to "definitely DOES belong," participants reported the degree to which they felt the objects belonged to the given category. To score this task, the ratings given for the atypical items are summed, with a high score of 30 (max score of 10 for each atypical exemplar).

Schizotypy: The personality trait *schizotypy* was measured using the 30-item Magical Ideation Scale (Eckblad & Chapman, 1983), a commonly used and highly validated measure of nonclinical positive schizotypy (Kwapil, Barrantes-Vidal, & Silvia, 2008). Cronbach's alpha for the scale has been reported as .82-.85 (Eckblad & Chapman, 1983). Each item on the scale is answered with Yes/No response options and the responses are summed for a highest possible score of 30. This scale was of particular interest as previous research indicates that it predicts creativity on a host of assessments (Dasse, Elkins, & Weaver III, 2015; Mohr, Graves, Gianotti, Pizzagalli, & Brugger, 2001; Badzakova-Trajkov, Häberling, & Corballis, 2011; Schuldberg, French, Stone, & Heberle, 1988).

Other measures: The personality trait *Openness to Experience* was measured using the 10-item Openness subscale of the Big Five Aspects Scale (BFAS; DeYoung, Quilty, & Peterson, 2007). Cronbach's alpha for this

scale is reported as .78. The response options for each item lie on a 5-point Likert scale with a range from 1 ("strongly disagree") to 5 ("strongly agree"). Responses are averaged across the scale to compute the Openness variable for a highest possible score of 5. This scale was included to ensure that our findings were not driven by this personality trait, which is also related to creative thinking and has been implicated in aesthetic preferences for abstract art (Chamorro-Premuzic, Reimers, Hsu, & Ahmetoglu, 2009).

We also measured several affective states related to the aesthetic response. We were particularly interested in negative states likely to be aroused by the Lettrist stimuli as happened at the film's disruptive showing at the Cannes Film Festival in 1951 (Isou, 2019; Uroskie, 2011). Since the intention of this radical movement was to deny the audience a coherent narrative and frustrate their expectations, we included measures of frustration and annoyance. We reasoned that the disjointedness of the Lettrist film might also lead to cognitive fatigue, thus we also measured drowsiness. However, since we were also interested in understanding if the film could promote overinclusive thinking and creative inspiration, we included two reactions strongly and frequently associated with creativity, namely curiosity and inspiration. Participants indicated how much the following adjectives described their current state: *annoyed, frustrated, drowsy, curious, inspired*. These states were presented in randomized order and responses were recorded on a scale of 1 to 4, with anchors "do NOT feel at all" to "feel a lot."

Procedure

The study used a between-subjects design in which participants were randomly assigned to watch one of two clips: the avant-garde Lettrist film or the conventional film. Before watching, participants were given the following directions, "Please make sure your audio is turned on and you are prepared to watch a 5-minute clip. On the next screen is a short video. After you watch it, we will ask a couple questions about it. When you are ready, please move to the next slide." Participants then moved to the next slide where a timer stopped the participants from moving forward before the video had finished. After watching either film, participants were asked how much meaning they perceived and to indicate their current affective states. They then completed the categorization task and the trait questionnaires in randomized order. The study took 10–12 minutes and participants were compensated $1.00 for their participation.

Results

Emotions elicited by the films

First, we examined whether the films had a differential impact on the participants' self-reported emotional states. In line with previous research on nonrepresentational art, the Lettrist film led to higher mean ratings of negative emotions, including frustration, annoyance, and even drowsiness. Conversely, the ratings for inspiration were higher for participants who watched the conventional film, and there were no significant differences in curiosity between the two films. Table 1 summarizes the results of the t-tests.

Meaning

First, an independent samples t-test was run to determine whether meaning-making, schizotypy scores, or overinclusive thinking differed by film. As anticipated, there was a significant difference in meaning across the two film conditions ($t(161) = 2.53$, $p = .012$). However, there were no statistically significant differences between film conditions for schizotypy ($t(161) = 1.22$, $p = .26$) nor overinclusive thinking ($t(161) = .21$, $p = .83$).

A moderated regression analysis was conducted to test the prediction that the effect of film type (conventional vs. avant-garde) on meaning-making would be moderated by trait levels of schizotypy. Descriptive statistics (means and standard deviations), correlations, and alpha coefficients for the variables included in the following regression analyses are provided in Table 2.

Table 1. The results of t-tests and effect sizes (Cohen's d) comparing affective states in both films, as well as mean and SD's for each film.

Measure	t	Cohen's d	Avant-garde (N = 73) Mean (SD)	Conventional (N = 90) Mean(SD)
Annoyed	9.37**	0.49	2.37 (1.06)	1.87 (1.03)
Frustrated	6.06*	0.36	2.29 (1.07)	1.90 (1.07)
Drowsy	4.57*	0.32	2.55 (.99)	2.21 (1.10)
Curious	2.06	−0.25	2.56 (.86)	2.76 (0.77)
Inspired	7.26**	−.043	2.30 (1.13)	2.77 (1.07)

*p <.05, **p <.01

Table 2. Correlations between meaning-making (meaning), overinclusive thinking (OT), Magical Ideation (schizotypy), and Openness, as well as mean and SDs for each. Reliability coefficients (Cronbach's) are also provided for the questionnaires.
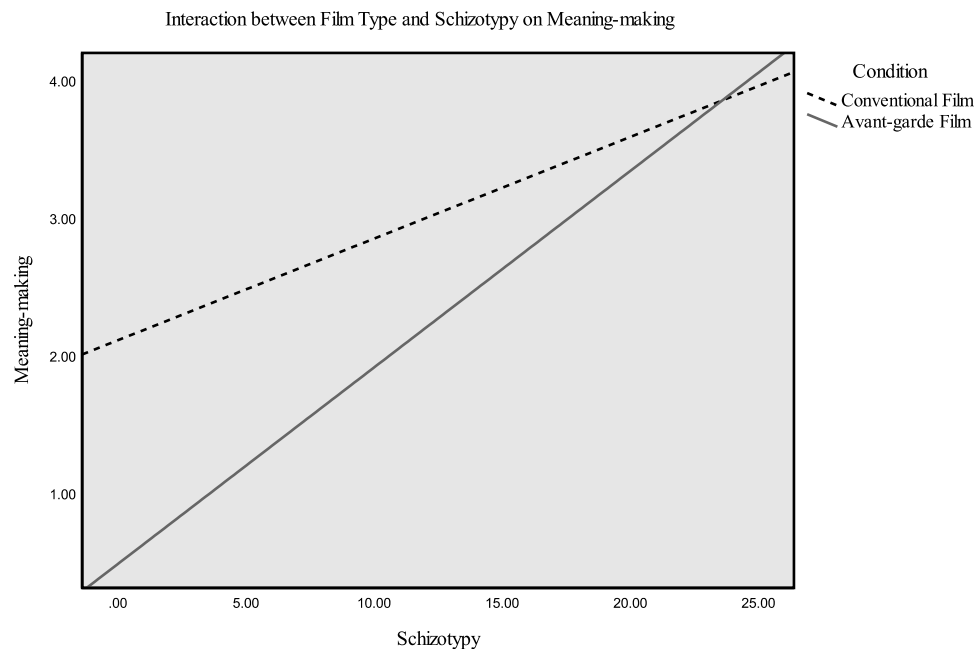
Measure	Cronbach's α	Avant-garde Mean(SD)	Conventional Mean(SD)	Meaning	OT	Schizotypy
Meaning		2.37 (1.67)	2.98 (1.40)	–		
OT	.92	5.00 (2.77)	4.91 (2.67)	.57***	–	
Schizotypy	.91	13.23 (7.52)	11.80 (7.44)	.48***	.55***	–
Openness	.67	3.73 (.55)	3.71 (.51)	.47***	.42***	.42***

There was a significant main effect of both film type ($b = -1.63$, $p < .001$) and schizotypy ($b = .074$, $p < .001$) on meaning-making. The conventional film led to greater perceived meaning and higher levels of schizotypy were associated with greater meaning-making. Together these two predictors explained 32% of the variance in meaning-making, $F(3, 159) = 24.97$, $p < .0001$.

The interaction term ($b = .069$) explained an additional 2.7% of variance in meaning-making, $F(1, 159) = 6.35$, $p < .05$. To explore this interaction, the simple slope for meaning-making was plotted by film type at mean levels of schizotypy, as well as one standard deviation below and above the mean. As seen in Figure 2, there was a significant difference in meaning-making depending on whether the conventional or the avant-garde film was viewed, but only for individuals at low or average levels of schizotypy [simple $b = -1.42$, t (160) $= -4.27$, $p < .0001$ and simple $b = -.73$, t (160) $= -3.57$, $p < .001$, respectively]. Individuals high in schizotypy perceived a similar amount of meaning in the conventional and the avant-garde film [$b = -.18$, t (160) $= -0.58$, $p = .56$]. See Table 3 for a summary of the conditional effects.

Note, the interaction at step 2 was relatively unchanged when the personality trait Openness was controlled for, $b = .064$, $R^2 = .023$, $F(1, 156) = 6.02$, $p < .05$, as well as when the affective state emotions were controlled for, $b = .064$, $R^2 = .010$, $F(1, 154) = 5.14$, $p < .05$. A moderation effect was also examined for Openness, controlling for schizotypy. The

Figure 2. Interaction between film type and schizotypy on levels of meaning-making. Conventional film: dashed line, Avant-Garde film: solid line. The b's are differences in simple slopes of film type (condition) predicting meaning-making at 3 levels of trait schizotypy: low, medium, and high (16th, 50th, 84th percentiles).*p < .05, **p < .01, ***p < .001.

Table 3. Conditional effects of film type on meaning at differing values of schizotypy.

Level of Schizotypy	Conditional Indirect Effect	SE	Boot LL 95%	Boot UL 95%
Low	−1.42***	.33	−2.08	−0.76
Medium	−.73***	.20	−1.13	−0.33
High	−.18	.31	−0.79	.43

n = 5000 bootstrapped resamples. Bootstrapped conditional indirect effect of film type (focal predictor) on overinclusive thinking through schizotypy (the moderator) at 3 levels, low, medium, and high: the 16th, 50th, and 84th percentiles. ***p < .001

interaction term was not significant, $R^2 = .013$, $F(1, 157) = 2.81$, $p = .096$.

Overinclusive thinking

As shown, film type interacted with schizotypy scores to predict greater meaning-making in the conventional film compared to the avant-garde film. We further predicted that these variables would play a role in affording downstream effects on overinclusive thinking. Specifically, we reasoned that since individuals lower in schizotypy find greater meaning in the conventional film, these variables should be modeled when examining the effect of film type on overinclusive thinking. Therefore, we adapted the moderation model to a moderated mediation model. We utilized PROCESS MACRO (a sequence of customizable commands) to facilitate the implementation of this model following the corresponding guidelines recommended by Preacher, Rucker, and Hayes (2007).

For this analysis, schizotypy was entered as a moderator and meaning-making as a mediator, using a bootstrapped sampling method of 5000. At step 1, meaning-making was significantly predicted by both schizotypy and film type as described in the previous section. In step 2, overinclusive thinking was regressed on film type and meaning-making, simultaneously, while including schizotypy as a moderator. The results of this moderated mediation model are summarized in Figure 3.

Individuals low in schizotypy perceived more meaning from the conventional film. We found that this in turn led to greater conceptual expansion, as measured by overinclusive thinking ($b = 1.03$, $p <.001$). As shown in Figure 2, the indirect effect of film type on overinclusive thinking via meaning-making was significantly moderated by schizotypy. In addition, the direct effect of film type on overinclusive thinking was also significant ($b = .72$, $p <.05$), such that the Lettrist film led to greater

overinclusive thinking. This indicates a suppressor effect, as both films led to overinclusive thinking in different ways. The indirect effect is driven by a positive influence of the conventional film on overinclusive thinking via meaning-making for individuals at lower levels of schizotypy. The direct effect, conversely, indicates that there is greater overinclusive thinking produced by the avant-garde film compared to the conventional film. This direct effect occurred only once the variables driving the indirect effect are controlled for.

Discussion

This study confirms the established relationship between schizotypy and the reception of nonrepresentational art forms. We extend this line of research by investigating a particular style of avant-garde film (Lettrist) and by examining the supporting role that meaning-making has in the aesthetic response. It was predicted that individuals at low levels of schizotypy would find greater meaning in the conventional film relative to the avant-garde film. The interaction observed between schizotypy and film type supports this prediction, revealing that low and average levels of schizotypy predict lower levels of meaning in the avant-garde film. Conversely, individuals at high levels of schizotypy exhibited no difference in their ability to perceive meaning in either film type.

We further predicted that the perception of meaning would enable downstream effects on overinclusive thinking, a style of thinking associated with conceptual expansion and creativity. We find partial support for this prediction; the conventional film led to greater meaning-making which in turn led to overinclusive thinking. Meaning-making, however, did not mediate the effect of the avant-garde film on overinclusive thinking. Indeed, only once controlling for meaning-making and schizotypy, by including these variables in the same model, did
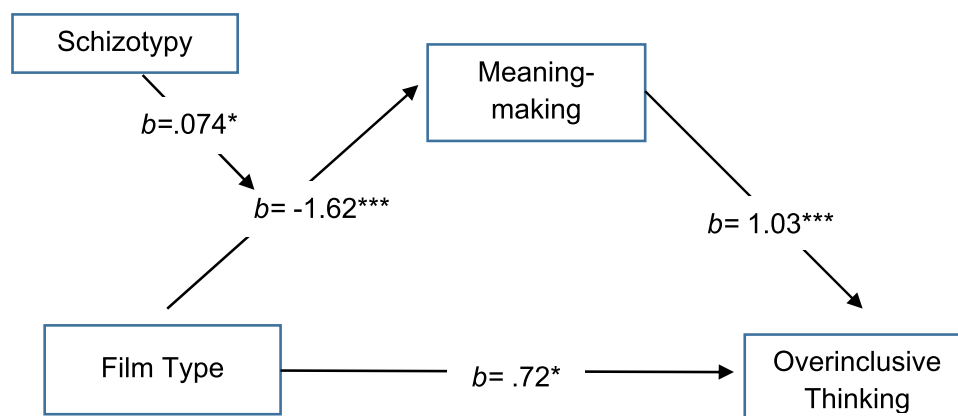

Figure 3. Summary of the regression analyses testing the moderated mediation model. Note path coefficients are standardized regression coefficients.*$p <.05$, **$p <.01$, ***$p <.001$.

the direct effect of the avant-garde film on overinclusive thinking become significant.

Study 2

As previously mentioned, overinclusive thinking is both thought to underlie the relationship between schizotypy and creativity, and predict creative thinking and performance (Burch, Hemsley, Pavelis, & Corr, 2006; Chiu, 2015). Therefore, we next examined whether the films would lead to increases in creative interest, and whether the ability of the films to boost creative interest would again be facilitated by meaning-making and schizotypy. In sum, Study 2 aimed to replicate and extend Study 1, including the moderated mediation effect involving film type, schizotypy, meaning-making and overinclusive thinking.

In accordance with our previous results, we predicted that the conventional film would lead to greater meaning-making for individuals at low and average levels of schizotypy, which in turn would predict overinclusive thinking. We further hypothesized that separating this indirect effect would reveal a significant direct effect of the avant-garde Lettrist film on overinclusive thinking, as observed in Study 1. Given that film responses did not previously differ at high levels of schizotypy, we predicted no difference in meaning-making between the avant-garde and conventional films for individuals at high levels of schizotypy.

Finally, we predicted a similar pattern of results for creative inspiration as observed for overinclusive thinking. Specifically, we predicted that individuals at lower levels of schizotypy would find more meaning in the conventional film, which would allow for greater feelings of creative inspiration. We further reasoned that once meaning-making and schizotypy were controlled for in the moderated mediation model, we might see a direct effect of the avant-garde film on creative interest.

Method

Participants

The study was approved by the Human Subjects Institutional Review Board at the University of California, Santa Barbara. 252 subjects (99 females, 146 males, 7 individuals chose not to respond) with a mean age of 35.46 years (SD = 10.6) participated online through Amazon's Mechanical Turk in exchange for payment. Participants were once again limited to those with a US location. The same screening settings were used as in Study 1 to prevent bad quality data and bots.

Materials

Overinclusive thinking: As in Study 1, participants were asked to rate items for how much they belong to the category *clothing*. In Study 2, we additionally included the category *vehicles* to add greater reliability (Chiu, 2015). For this category, the typical exemplars were *train, automobile, bu*s and the atypical exemplars were *camel, feet, elevator*. Using a 10-point Likert scale, with anchors "definitely does NOT belong" to "definitely DOES belong," participants reported the degree to which they felt the objects belonged to the given category.

Schizotypy: The personality trait schizotypy was again measured using the 30-item Magical Ideation Scale (Eckbald & Chapman, 1983).

Creativity Engagement Measure: We assessed individuals' current desire to engage in creative activities with the Creative Inspiration Scale (CIS), developed by the first author. In unpublished research, this scale has shown a robust single factor and a Cronbach's Alpha of .92, both predicting the number of artworks participants voluntarily chose to view and creative performance. This 20-item scale asks participants to rate the degree to which they would be interested in engaging in various creative activities if they had the opportunity to do them *right now*. Responses are recorded on a scale of 1–7 with anchors "Not at all interested" to "Very interested," and then averaged for a top score of 7. Items include *creating* artistic products, like "Take photographs" or "Create a sculpture," and *engaging* with artistic products, like "Listen to music" or "Go to an abstract art gallery."

Procedures

Film: The study again used a between-subjects design wherein participants were randomly assigned to one of the two conditions from Study 1, i.e., the 5-minute clip from the avant-garde film *Treatise on Venom and Eternity* or the 5-minute conventional film clip from *La Ronde*. Participants were then asked to indicate whether they watched the film. To increase the chances of honest responses, participants were informed that the answer would not affect their monetary compensation of $1. Given past research indicating that honesty primes are effective in reducing lying on Mturk (Goodman, Cryder, & Cheema, 2013; Jacqueme et al., 2021), participants were also told that their response affects the quality of our research and that we appreciate their honesty.

As in Study 1, participants rated the degree to which they found the film clip meaningful and completed the

overinclusive thinking task. They then filled out the Creative Inspiration Scale and the Magical Ideation scale. The study took 10–12 minutes.

Results

Exclusions

One participant responded that they did not watch the film, therefore the following analyses were conducted on 251 participants: 134 watched the conventional clip and 117 watched the avant-garde.

Schizotypy, meaning-making, and overinclusive thinking

First, independent samples t-tests were run to determine whether meaning, creative inspiration, overinclusive thinking, and schizotypy scores differed by film. The results of these tests, as well as Cohen's d and descriptions of affective states by film, are provided in Table 4. As seen in Study 1, there was a significant difference between the perceived meaning of the film across the two film conditions ($t(249) = 4.54$, $p < .001$). However, there were no statistically significant differences between film conditions for creative inspiration ($t(249) = 1.53$, $p = .13$), overinclusive thinking ($t(249) = .21$, $p = .84$), nor schizotypy ($t(249) = 0.56$, $p = .58$).

To replicate the results from Study 1, a moderated mediation was run to determine a) whether film type interacted with schizotypy scores to predict greater meaning-making in the conventional film compared to the avant-garde film, b) whether meaning-making in turn predicted overinclusive thinking, and c) whether separating and controlling for this indirect path would reveal a significant effect of the avant-garde film on overinclusive thinking. PROCESS MACRO was again utilized to facilitate the implementation of this model.

Schizotypy was entered as a moderator and meaning-making as a mediator, using a bootstrapped sampling method of 5000. At step 1, meaning-making was significantly predicted by both schizotypy and film type. As found in Study 1, meaning was higher for the conventional film and for individuals high in schizotypy (regardless of film type). Individuals low in schizotypy perceived more meaning from the conventional film. The interaction term ($b = .050$) explained an additional 1.5% of variance in meaning-making, $F(1, 247) = 5.40$, $p < .05$. As before, there was a highly significant difference in meaning-making depending on whether the conventional or the avant-garde Lettrist film was watched, but only for individuals at low or average levels of schizotypy, $b = -1.14$, $t(1, 247) = -5.13$, $p < .0001$ and $b = -.84$, $t(1, 247) = -5.34$, $p < .0001$, respectively. Individuals high in schizotypy perceived a similar amount of meaning in the conventional and the avant-garde film, $b = -.30$, $t(1,247) = -1.15$, $p = .25$; see Table 5 for a summary of the conditional effects. Meaning-making in turn led to greater conceptual expansion, as measured by overinclusive thinking, $b = .78$, $t(2, 248) = 8.80$, $p < .001$.

The direct effect of film type on overinclusive thinking was also significant, $b = .58$, $t(2, 248) = 2.20$, $p < .05$, such that the avant-garde film led to greater overinclusive thinking. But as in Study 1, we observed a suppressor effect since both films led to overinclusive thinking. For individuals at low or average levels of schizotypy, the conventional film led to greater meaning-making which in turn was associated with overinclusive thinking. Therefore, controlling for schizotypy and meaning-making, the direct effect indicated greater

Table 4. The results of t-tests and effect sizes (Cohen's d) comparing affective states in both films, as well as mean and SD's for each film.

Measure	t	Cohen's d	Avant-garde ($N = 117$) Mean (SD)	Conventional ($N = 134$) Mean (SD)
Meaning	4.54**	0.55	1.87 (1.48)	2.69 (1.39)
Creative inspiration	1.53	0.19	2.68 (0.98)	2.87 (1.00)
Overinclusive thinking	0.21	0.027	4.00 (2.26)	4.07 (2.33)
Schizotypy	0.56	0.070	9.22 (7.07)	9.73 (7.39)

*$p < .05$, **$p < .01$

Table 5. Conditional effects of film type on meaning at differing values of schizotypy.

Level of Schizotypy	Conditional Indirect Effect	SE	Boot LL 95%	Boot UL 95%
Low	−1.14***	.22	−1.58	−0.70
Medium	−.84***	.16	−1.15	−0.53
High	−.30	.26	−0.80	.21

n = 5000 bootstrapped resamples. Bootstrapped conditional indirect effect of film type (focal predictor) on overinclusive thinking through schizotypy (the moderator) at 3 levels, low, medium, and high: the 16th, 50th, and 84th percentiles. ***p <.001
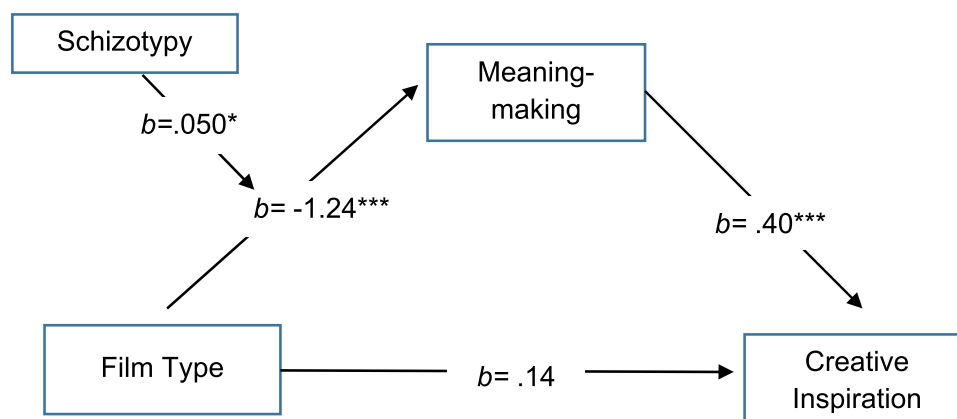
Figure 4. Summary of the regression analyses testing the moderated mediation model. Note path coefficients are standardized regression coefficients.*$p < .05$, **$p < .01$, ***$p < .001$.

Creative inspiration

We then examined whether the films led to creative inspiration. Before conducting the PROCESS analysis, we tested this relationship directly without inclusion of meaning-making or schizotypy. Film condition was entered as the IV in an ANOVA with the average score on the Creative Inspiration Scale entered as the DV. We found no main effect of condition on creative inspiration, $F(1, 249) = 2.33$, $p = .13$. Next, we entered meaning-making as a mediator and schizotypy as a moderator. Here we found a significant moderated mediation model (Figure 4).

We found a significant interaction between schizotypy and film type: individuals at low and average levels of schizotypy experienced more meaning from the conventional film. In addition, we saw that meaning-making led to increased creative inspiration, $b = .40$, t (2, 248) = 11.22, $p < .001$ (see Figure 3). We did not, however, find that separating this indirect effect led to a significant direct effect of film type on creative inspiration $b = .14$, $t(2, 248) = 1.31$, $p = .19$. In summary, the effects on creative inspiration were driven by the effects

of the conventional film via meaning-making, and only for individuals at low or average levels of schizotypy.

Correlations between variables

As predicted by previous theoretical and empirical research, the variables that we chose to include in this study were all highly correlated to schizotypy. Table 6 lists the correlations between the measures in our study.

General discussion

The present research examines the inter-relationships between meaning-making, over-inclusive thinking, creative inspiration, and schizotypy in the context of film viewing. We observe different patterns of meaning-making as a function of schizotypal personality and film type. We further find that the perception of meaning is an important intermediary step in facilitating downstream effects on cognition.

Overall, the conventional film was generally perceived as more meaningful. This is not surprising given that the Lettrist film was designed to disrupt meaning and visual representation in order to push the audience to engage in different modes of thinking. However, we find that individuals high in schizotypy perceive both

Table 6. Correlations between meaning-making (meaning), creative inspiration (inspiration), overinclusive thinking (OT), and Magical Ideation (schizotypy), as well as mean and SDs for each. Reliability coefficients (Cronbach's) are also provided for the questionnaires.

Measure	Cronbach's α	Avant-garde Mean (SD)	Conventional Mean(SD)	Meaning	Inspiration	OT
Meaning		1.87 (1.48)	2.69 (1.39)	–		
Inspiration	.95	2.68 (.98)	2.87 (1.00)	.58***	–	
OT	.90	4.00 (2.26)	4.06 (2.33)	.47***	.62***	–
Schizotypy	.91	9.22 (7.07)	9.73 (7.39)	.50***	.61***	.65***

the conventional and avant-garde films as being equally meaningful. It is possible that no differences in perceived meaning were observed because schizotypy is highly correlated to meaning-making (see Table 6), making differences in meaning between stimuli hard to capture (i.e., a ceiling effect). Indeed, in keeping with past research, individuals at high levels of schizotypy displayed an overall heightened attribution of meaning regardless of the stimuli (Crespi, Dinsdale, Read, Hurd, & Fonseca-Pedrero, 2019; Partos et al., 2016; Rawlings, 2000).

In addition, our studies reveal a surprising result regarding the effect of film types on overinclusive styles of thinking: both films led to overinclusive thinking, but in different ways. The avant-garde film clip led to over-inclusive thinking once schizotypy and meaning-making were controlled for by separating out their indirect effect. However, for individuals at lower levels of schizotypy, the conventional film was perceived as more meaningful, which in turn predicted greater overinclusive thinking. This downstream effect may indicate that while exposure to avant-garde or nonrepresentational art can lead to different styles of thinking for some individuals, other individuals (such as those low in schizotypy) may be more influenced by art forms that are easier to make sense of.

These findings further suggest that meaning-making may play a critical role in the expansion of conceptual boundaries for individuals low in schizotypy, i.e., reducing conceptual rigidity and enhancing associational thinking. This is in line with the meaning maintenance model which suggests that threats to meaning cause a decline in openness to new ideas as the individual seeks to affirm their existing beliefs. Our results therefore hint at a reverse relationship: successful meaning-making may allow individuals to loosen existing conceptualizations and incorporate a new understanding.

In Study 2, we replicate and extend this study to show the facilitating effects of schizotypy and meaning-making on creative inspiration. We find that the greater ability of the conventional film to elicit meaning-making was associated with a greater desire to engage in creative activities. This may suggest that meaning-making is an essential intermediary step for promoting feelings of creative inspiration in response to visual media. However, past research suggests that experiences that test existing meaning frameworks may evoke or hinder creative thinking based on specific personality characteristics. For instance, images that depict schema-violations (e.g., an Eskimo in a desert) are not only preferred by individuals higher in Openness to Experience (Gocłowska et al., 2017), but also promote creative thinking when viewed by individuals who have a low need for structure (Gocłowska et al., 2014).

Schizotypy has also been linked to the positive reception of nonrepresentational art as well as the production of creative works (Batey & Furnham, 2008; Burch, Pavelis, Hemsley, & Corr, 2006; Miller & Tal, 2007). Indeed, schizotypal characteristics have even been linked to the phenomenology of the creative process (Nelson & Rawlings, 2008). Specifically, some of the characteristics that support creative behavior, like absorption and flow states, are also characterized by schizotypal thinking. These findings may suggest that certain personality types are not simply attracted to original or nonconforming works, but also have a greater capacity for generating such works.

In line with this notion, it has recently been theorized that aesthetic experiences *mirror* the art-making process, an idea referred to as the mirror model of art (Tinio, 2013). In other words, the same cognitive processes involved in the *engagement* of aesthetic products may be involved in the *production* of artistic works. As mentioned, overinclusive thinking is manifest in schizotypal personalities and has also been found to be a key process underlying creative thinking. So, based on the mirror model of art, it is plausible that overinclusive thinking not only underlies creative and schizotypal thinking but is also produced through aesthetic experiences. The findings from our current studies show initial support for this theory as exposure to films promoted overinclusive thinking.

Limitations & future directions

Given the growing support for meaning-making as a critical element in the reception of art, future research should investigate methods for improving audiences' capacity to perceive or construct meaning. This notion has been a discussion point for museum and gallery curators wishing to broaden the scope of appreciation of modern art (Carter-Birken, 2008). Visitors to art centers could be given strategies for how to engage with modern art and encouraged to create their own meaning, for instance by suspending critical thinking or finding ways to connect their own knowledge and life experiences with the piece they are observing. Indeed, in a survey of art museum visitors, researchers found that participants welcomed more interpretative information to guide their understanding (Moussouri, Dodd, & van Loenen, 2001). Initial evidence also suggests that enabling a new understanding of an artistic work by providing additional contextual information may facilitate interest in the work, particularly for individuals

high in general interest based curiosity (Zedelius, Gross, & Schooler, 2022, p. 2021). However, the idea that meaning-making in the arts is a process that can be learned or taught has yet to be examined empirically.

Another important way to extend this research would be to incorporate qualitative measures of meaning, which could add more nuance and reliability. The results of the current study indicate that schizotypy is a factor contributing to the ability to perceive meaning from obscure stimuli, however, we do not know the qualitative aspects of that experience. Existing research, including the present study, typically uses brief Likert style questions to assess individuals' comprehension or meaning of an artwork (Keller et al., 2019; Leder et al., 2012; Mullennix et al., 2018), but these simplistic measures don't allow for a deeper understanding of the process of meaning-making. There may, for instance, be an important difference between *constructing* meaning and *detecting* meaning (King & Hicks, 2009). Future research should examine meaning-making processes in the arts to determine whether individuals engage in explicit narrative building or whether meaningfulness is more of a felt quality, a sense that the work has a nontrivial message.

In the current study, we measured five aesthetic emotions likely to be elicited by the chosen experimental film. However, a more comprehensive set of aesthetic emotions should be included in future iterations. Additionally, methods beyond self-report, such as facial myography, could be used to capture a more dynamic range of emotional reactions in the context of the aesthetic response (Gerger, Leder, & Kremer, 2014). Recent research suggests that galvanic skin response (GSR) can also act as a valid indicator of audience engagement (Latulipe, Carroll, & Lottridge, 2011), while theoretical work has linked meaning-making to chills – the physiological response colloquially known as goosebumps (Schoeller & Perlovsky, 2016). Self-report scales have their obvious drawbacks, not the least of which is variations due to individual interpretations of questions or social-desirability biases. Using physiological measures as a proxy for audience engagement and arousal allows researchers to draw real-time inferences about an individual's mental, cognitive, and emotional states.

Finally, future research should consider extending the current results under different settings. A limitation of the present studies is the potential for poor participant responding due to the online format. Although past research suggests that Mechanical Turk offers comparable (or even better) quality data to student and local community data (Hauser & Schwarz, 2016; Kennedy et al., 2020; Thomas & Clifford, 2017), there is always

the possibility of poor participant responding. We used basic measures for ensuring compliance in watching the video; warning participants that questions about the video would follow, not allowing the participants to move forward in the study until the video had completed, and using an honesty-based question to elicit feedback on compliance. We cannot be sure based on these methods that participants truly did watch the videos. Fortunately, any noise contributed by participants failing to watch the videos should be evenly distributed across both conditions and thus is unlikely to account for the observed effects, replicated across two studies. However, future research should consider using content-based checks or extending this research in controlled laboratory settings in order to ensure quality control.

The current study offers concurrent consideration of multiple factors that may play an important role in aesthetic response. By employing related trait and state measures (schizotypy and meaning-making) we were able to examine the interplay between these factors in the context of film viewing. It is important to note that other state and trait variables may also be associated with how art and films are received. Future research should consider employing a similar strategy – considering variables related to the aesthetic response, and to each other, in order to examine possible interactions. These examinations could include other styles of film and other artistic movements within cinematic art, beyond Lettrism. This study also considered possible downstream effects on cognition afforded by exposure to film. Future research should investigate other possible effects of art and film viewing, including imaginative thinking and creative performance.

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